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**west virginia** department of environmental protection

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Office of Oil and Gas  
601 57th Street SE  
Charleston, WV 25304  
(304) 926-0450  
(304) 926-0452 fax

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
www.dep.wv.gov

July 17, 2014

**WELL WORK PERMIT**  
**Horizontal 6A Well**

This permit, API Well Number: 47-1706533, issued to ANTERO RESOURCES CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin  
Chief

Operator's Well No: YOHO UNIT 2H  
Farm Name: BROWN, MELODY  
**API Well Number: 47-1706533**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 07/17/2014

**Promoting a healthy environment.**



WW-6B  
(9/13)

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Corporation 494488557 017-Doddridge Grant West Union 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Yoho Unit 2H Well Pad Name: Melody Pad

3) Farm Name/Surface Owner: Melody Brown Public Road Access: CR 24

4) Elevation, current ground: -1165' Elevation, proposed post-construction: 1135'

5) Well Type (a) Gas  Oil  Underground Storage   
Other

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
Marcellus Shale: 7200' TVD, Anticipated Thickness- 55 feet, Associated Pressure- 2950#

8) Proposed Total Vertical Depth: 7200' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 18,700' MD

11) Proposed Horizontal Leg Length: 9617'

12) Approximate Fresh Water Strata Depths: 216', 291', 407'

13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.

14) Approximate Saltwater Depths: 802', 906', 1805'

15) Approximate Coal Seam Depths: 802'

16) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes  No

(a) If Yes, provide Mine Info: Name: \_\_\_\_\_  
Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

*DCW  
6-19-2014*

WW-6B  
(9/13)

18)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	475'	475' *see #19	CTS, 660Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2480'	2480'	CTS, 1010 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18700'	18700'	4741 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

*6-19-2014*

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

WW-6B  
(9/13)

**19) Describe proposed well work, including the drilling and plugging back of any pilot hole:**

Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.  
\*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

**20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:**

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 3.09 acres

22) Area to be disturbed for well pad only, less access road (acres): 3.09 acres

**23) Describe centralizer placement for each casing string:**

Conductor: no centralizers  
Surface Casing: one centralizer 10' above the float shoe, one on the Insert float collar and one every 4th joint spaced up the hole to surface.  
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.  
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

**24) Describe all cement additives associated with each cement type:**

Conductor: no additives, Class A cement.  
Surface: Class A cement with 2-3% CaCl<sub>2</sub> and 1/4 lb of flake  
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat  
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51  
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

**25) Proposed borehole conditioning procedures:**

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.  
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.  
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.  
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

\*Note: Attach additional sheets as needed.

WW-9  
(9/13)

API Number 47 - 017 - \_\_\_\_\_  
Operator's Well No. Yoho Unit 2H

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494488557

Watershed (HUC 10) Wolfpen Run Quadrangle West Union 7.5'

Elevation 1135' County Doddridge District Grant

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  No

Will a pit be used? Yes  No

If so, please describe anticipated pit waste: No pit will be used at this site (Drilling and Flowback Fluids will be stored in tanks. Cuttings will be tanked and hauled off site.)

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? N/A

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number \_\_\_\_\_ )
- Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34 )
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain \_\_\_\_\_)

*DCW  
6-19-2014*

Will closed loop system be used? If so, describe: Yes

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Surface - Air/Freshwater, Intermediate - Dust/Stuff Foam, Production - Water Based Mud

-If oil based, what type? Synthetic, petroleum, etc. N/A

Additives to be used in drilling medium? Please See Attachment

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Stored in tanks, removed offsite and taken to landfill.

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-98)

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Cole Kilstrom*

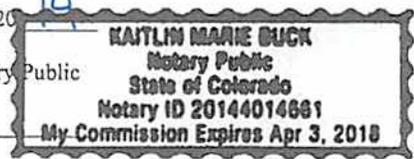
Company Official (Typed Name) Cole Kilstrom

Company Official Title Environmental Specialist

Subscribed and sworn before me this 21<sup>st</sup> day of May, 2014

*Kaitlin Buck* Notary Public

My commission expires 4/3/2014



Form WW-9

Operator's Well No. Yoho Unit 2H

Antero Resources Corporation

Proposed Revegetation Treatment: Acres Disturbed 3.09 Prevegetation pH \_\_\_\_\_

Lime 2-3 Tons/acre or to correct to pH 6.5

Fertilizer type Hay or straw or Wood Fiber (will be used where needed)

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

\*Please note that this location is sharing the Access Roads "A" & "B" (13.27), Staging Areas "A" & "B" (3.73), Centralized Impoundment (5.96), Truck Turnaround (1.06), Production Equipment (21) and Excess/Topsoil Materials Stockpiles (12.67) with the proposed Melody Centralized Impoundment. The Melody Pad will consist of 3.09 total acres of disturbance which is referenced as "Staging Area B" (3.09) on the Melody Centralized Impoundment design.

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Crownvetch	10-15
<small>*See attached Table 3 for additional seed type (Melody Pad Design Page 14)</small>		<small>*See attached Table 3 for additional seed type (Melody Pad Design Page 14)</small>	
<small>*or type of grass seed requested by surface owner</small>		<small>*or type of grass seed requested by surface owner</small>	

NOTE: No Fescue or Timothy Grass shall be used

Attach:

Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Douglas Newlon

Comments: Pressed + Mulch install + maintain IERS to Wv Dep regulations

Title: Oil & Gas Inspector Date: 6-19-2014

Field Reviewed? (  ) Yes (  ) No

***Form WW-9 Additives Attachment*****SURFACE INTERVAL**

1. Fresh Water
2. Soap –Foamer AC
3. Air

**INTERMEDIATE INTERVAL*****STIFF FOAM RECIPE:***

- 1) 1 ppb Soda Ash / Sodium Carbonate-Alkalinity Control Agent
- 2) 1 ppb Conqor 404 ( 11.76 ppg) / Corrosion Inhibitor
- 3) 4 ppb KLA-Gard ( 9.17 ppg) / Amine Acid Complex-Shale Stabilizer
- 4) 1ppb Mil Pac R / Sodium Carboxymethylcellulose-Filtration Control Agent
- 5) 12 ppb KCL / Potassium Chloride-inorganic Salt
- 6) Fresh Water 80 bbls
- 7) Air

**PRODUCTION INTERVAL**

1. Alpha 1655  
Salt Inhibitor
2. Mil-Carb  
Calcium Carbonate
3. Cottonseed Hulls  
Cellulose-Cottonseed Pellets – LCM
4. Mil-Seal  
Vegetable, Cotton & Cellulose-Based Fiber Blend – LCM
5. Clay-Trol  
Amine Acid Complex – Shale Stabilizer
6. Xan-Plex  
Viscosifier For Water Based Muds
7. Mil-Pac (All Grades)  
Sodium Carboxymethylcellulose – Filtration Control Agent
8. New Drill  
Anionic Polyacrylamide Copolymer Emulsion – Shale Stabilizer
9. Caustic Soda  
Sodium Hydroxide – Alkalinity Control
10. Mil-Lime  
Calcium Hydroxide – Lime
11. LD-9  
Polyether Polyol – Drilling Fluid Defoamer
12. Mil Mica  
Hydro-Biotite Mica – LCM

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13. Escaid 110  
Drilling Fluid Solvent – Aliphatic Hydrocarbon
14. Ligco  
Highly Oxidized Leonardite – Filtration Control Agent
15. Super Sweep  
Polypropylene – Hole Cleaning Agent
16. Sulfatrol K  
Drilling Fluid Additive – Sulfonated Asphalt Residuum
17. Sodium Chloride, Anhydrous  
Inorganic Salt
18. D-D  
Drilling Detergent – Surfactant
19. Terra-Rate  
Organic Surfactant Blend
20. W.O. Defoam  
Alcohol-Based Defoamer
21. Perma-Lose HT  
Fluid Loss Reducer For Water-Based Muds
22. Xan-Plex D  
Polysaccharide Polymer – Drilling Fluid Viscosifier
23. Walnut Shells  
Ground Cellulosic Material – Ground Walnut Shells – LCM
24. Mil-Graphite  
Natural Graphite – LCM
25. Mil Bar  
Barite – Weighting Agent
26. X-Cide 102  
Biocide
27. Soda Ash  
Sodium Carbonate – Alkalinity Control Agent
28. Clay Trol  
Amine Acid complex – Shale Stabilizer
29. Sulfatrol  
Sulfonated Asphalt – Shale Control Additive
30. Xanvis  
Viscosifier For Water-Based Muds
31. Milstarch  
Starch – Fluid Loss Reducer For Water Based Muds
32. Mil-Lube  
Drilling Fluid Lubricant

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## Well Site Safety Plan

### Antero Resources

**Well Name:** Rexal Unit 1H, Kreitler Unit 1H, Kreitler Unit 2H, Bradford Unit 1H, Bradford Unit 2H, Deano Unit 1H, Weinhold Unit 1H, Weinhold Unit 2H and Yoho Unt 2H

**Pad Location:** MELODY PAD  
Doddridge County/ Grant District

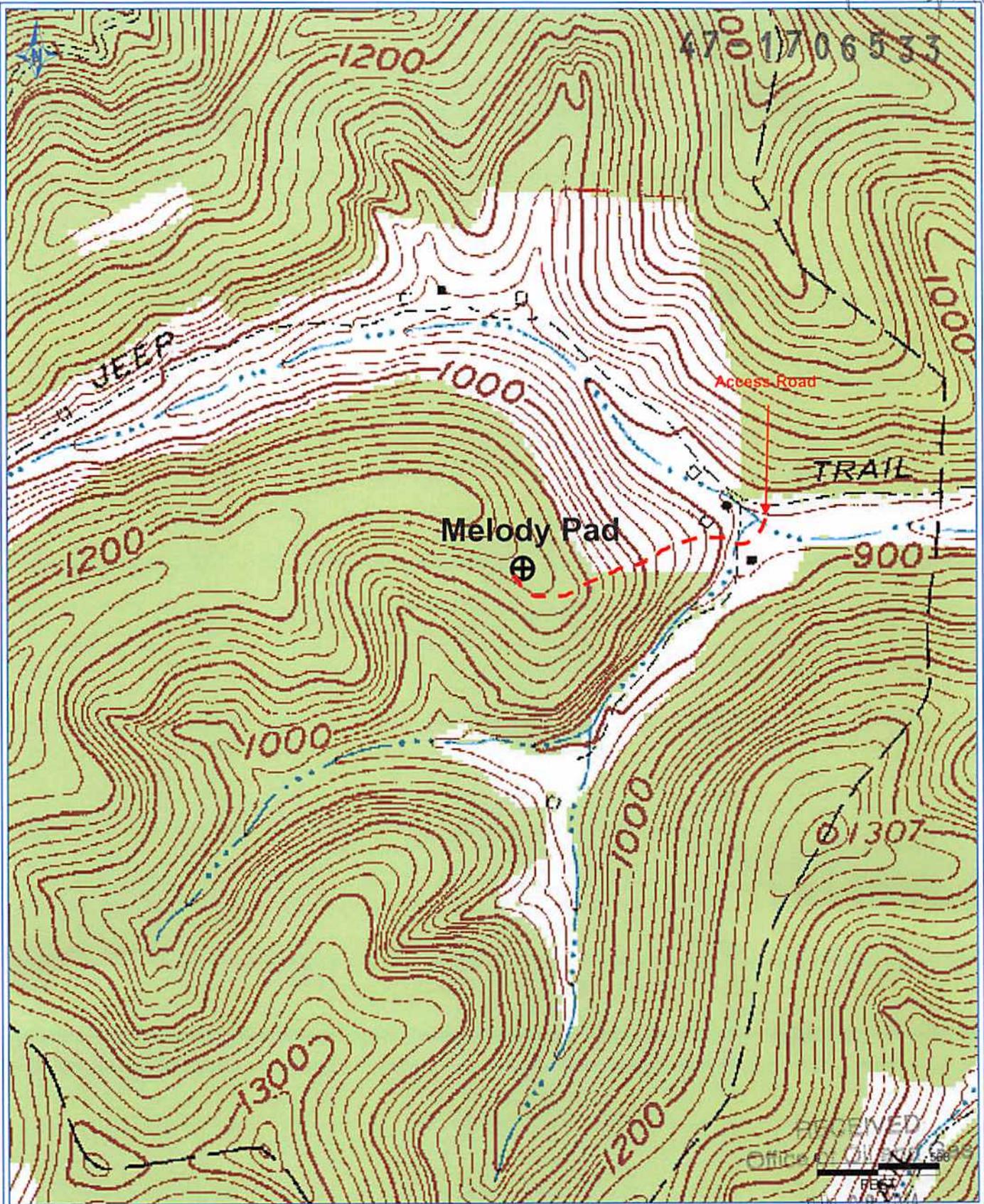
**GPS Coordinates:** Lat 39°21'30.41"/Long 80°45'33.04" (NAD83)

#### Driving Directions:

From the intersection of US-50 and WV Rt 18 head North on WV 18 for .6 miles. Turn right onto Davis Street/Old US 50 East. Continue for 1 mile then turn left onto Co route 5/Rock Run Rd. Continue for 2.8 miles then turn left onto Co route 28/Nutter Fork. Continue for 1.8 miles then turn right onto Bulltown Rd. Continue for 1 mile then continue onto Knights Fork. Continue on Knights fork for 1.2 miles then take a slight left onto Co RT 24/Camp Mistake Rd. Continue for 0.4 miles. Access Rd on Left.

4-25-2014  
DCW

plat spotted ✓



DETRA 3/19/2014 1:20:25 PM

**Antero Resources Corporation**  
Appalachian Basin  
Yoho Unit 2H  
Doddridge County  
Quadrangle: Smithburg & West Union  
Watershed: Wolfpen Run & Little Flint Run  
District: Grant  
Date: 3-19-2014

47-1706533

LATITUDE 39°22'30"

2,642'

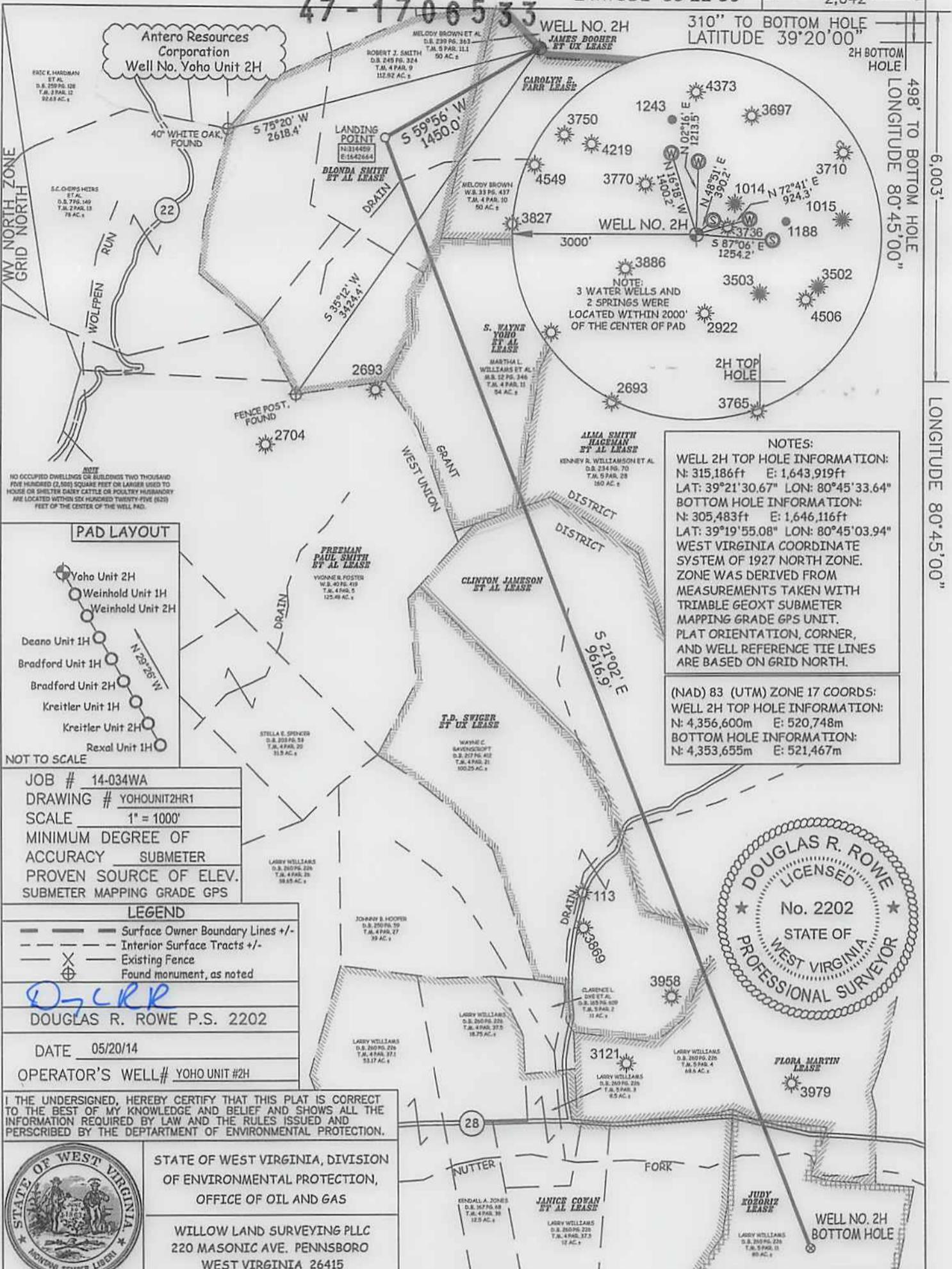
310" TO BOTTOM HOLE  
LATITUDE 39°20'00"

2H BOTTOM HOLE

498' TO BOTTOM HOLE  
LONGITUDE 80°45'00"

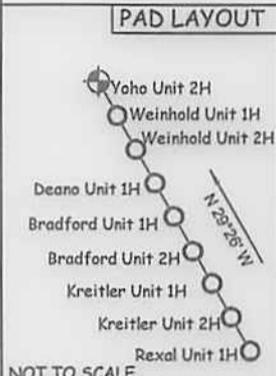
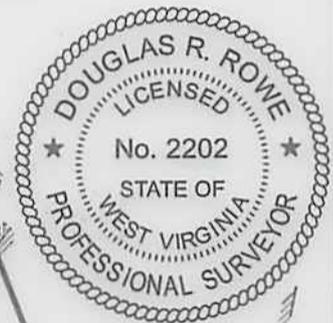
6,003'

LONGITUDE 80°45'00"



**NOTES:**  
 WELL 2H TOP HOLE INFORMATION:  
 N: 315,186ft E: 1,643,919ft  
 LAT: 39°21'30.67" LON: 80°45'33.64"  
 BOTTOM HOLE INFORMATION:  
 N: 305,483ft E: 1,646,116ft  
 LAT: 39°19'55.08" LON: 80°45'03.94"  
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE.  
 ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:  
 WELL 2H TOP HOLE INFORMATION:  
 N: 4,356,600m E: 520,748m  
 BOTTOM HOLE INFORMATION:  
 N: 4,353,655m E: 521,467m



JOB # 14-034WA  
 DRAWING # YOHOUNIT2HR1  
 SCALE 1" = 1000'  
 MINIMUM DEGREE OF ACCURACY SUBMETER  
 PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

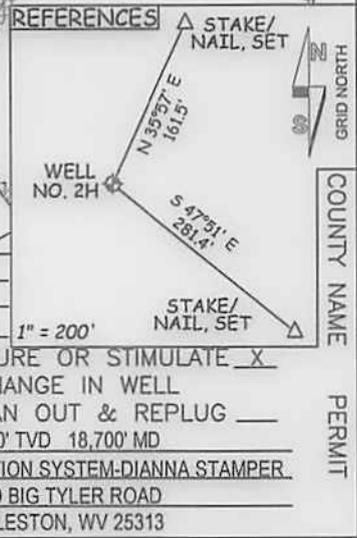
**LEGEND**  
 - - - Surface Owner Boundary Lines +/-  
 - - - Interior Surface Tracts +/-  
 X Existing Fence  
 ⊕ Found monument, as noted

DOUGLAS R. ROWE P.S. 2202  
 DATE 05/20/14  
 OPERATOR'S WELL# YOHO UNIT #2H

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS  
 WILLOW LAND SURVEYING PLLC  
 220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS  
 WELL TYPE: OIL GAS  LIQUID INJECTION WASTE DISPOSAL  
 (IF "GAS") PRODUCTION  STORAGE DEEP SHALLOW   
 LOCATION: ELEVATION 1,135' WATERSHED WOLFPEN RUN  
 QUADRANGLE WEST UNION 7.5' DISTRICT GRANT COUNTY DODDRIDGE  
 SURFACE OWNER MELODY BROWN ACREAGE 50 ACRES +/-  
 OIL & GAS ROYALTY OWNER JAMES BOOHER ET UX; CAROLYN E. FARR; BLONDA SMITH ET AL.; S. WAYNE YOHO ET AL.; ALAN SMITH HAGEMAN ET AL.; CLINTON JAMESON ET AL.; T.D. SWIGER ET UX; FLORA MARTIN; JUDY KOZORIZ  
 LEASE ACREAGE 50 AC±; 50 AC±; 114 AC±; 54.75 AC±; 162 AC±; 99 AC±; 100 AC±; 72.25 AC±; 80 AC±  
 PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
 PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_  
 TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,200' TVD 18,700' MD  
 WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT CT CORPORATION SYSTEM-DIANNA STAMPER  
 ADDRESS 1615 WYNKOOP STREET ADDRESS 5400 D BIG TYLER ROAD  
 FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313



**LOCATION COORDINATES**

ACCESS ROAD ENTRANCE  
 LATITUDE: 39.359168 LONGITUDE: -80.755057 (NAD 83)  
 N 4356663.66 E 521102.41 (UTM NAD83, ZONE 17 METERS)

CENTROID OF WELL PAD  
 LATITUDE: 39.358444 LONGITUDE: -80.759177 (NAD 83)  
 N 4356582.87 E 520747.70 (UTM NAD83, ZONE 17 METERS)

**GENERAL DESCRIPTION**

THE WELL PAD AND ACCESS ROAD(S) ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

**FLOODPLAIN NOTE**

THE PROPOSED SITE IS LOCATED IN FLOODZONE "X" PER FEMA FLOOD MAP #54017C0110C.

**MISS UTILITY STATEMENT**

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. TICKET #1310523707. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

**ENTRANCE PERMIT**

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

**GEOTECHNICAL NOTE**

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY TERRA TESTING, INC. UNDER THE TECHNICAL SUPERVISION OF KLEINFELDER ON JULY 31, 2013-AUGUST 7, 2013 AND JANUARY 17, 2014-FEBRUARY 01, 2014. THIS REPORT PREPARED BY KLEINFELDER, DATED FEBRUARY 20, 2014, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THEIR REPORT WAS USED IN THE PREPARATION OF THESE PLANS. HOWEVER, ADDITIONAL INVESTIGATION IS NECESSARY TO CONFIRM THE ESTIMATED TOE KEY DEPTHS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY KLEINFELDER FOR ADDITIONAL INFORMATION, AS NEEDED.

**ENVIRONMENTAL NOTES**

WETLAND DELINEATIONS WERE PERFORMED FEBRUARY & JUNE, 2013 BY ALLSTAR ECOLOGY, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE JUNE 20, 2013 STREAM AND WETLAND DELINEATION INDEX MAP WAS PREPARED BY ALLSTAR ECOLOGY, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

MELODY PERENNIAL STREAM IMPACT (LINEAR FEET)			
Stream and Impact Cause	Culvert (LF)	Inlets/Outlets Structures (LF)	Total Impact (LF)
R/W Perennial Stream 3 (Access Rd "A")	46	0	46

**PROJECT CONTACTS**

**OPERATOR:**  
 ANTERO RESOURCES CORPORATION  
 535 WHITE OAKS BLVD.  
 BRIDGEPORT, WV 26330  
 PHONE (304) 842-4100  
 FAX (304) 842-4112

API#1706477  
 API#1706479  
 API#1706480

**ELI WAGNER - ENVIRONMENTAL ENGINEER**  
 OFFICE: (304) 842-4068 CELL: (304) 476-9770

**JOHN KAWCAX - OPERATIONS SUPERINTENDENT**  
 CELL: (817) 368-1553

**AARON KUNTZER - CONSTRUCTION SUPERVISOR**  
 CELL: (405) 227-8344

**ANTHONY SMITH - FIELD ENGINEER**  
 OFFICE: (304) 842-4208 CELL: (304) 673-6196

**ROGER DUNLAP - SURVEYING COORDINATOR**  
 CELL: (304) 651-5588

**RANDAL RANDOLPH - LAND AGENT**  
 CELL: (405) 816-5956

**ENGINEER/SURVEYOR:**  
 NAVITUS ENGINEERING, INC.  
 CYRUS S. KLUMP, PE - PROJECT MANAGER/ENGINEER  
 OFFICE: (888) 662-4185 CELL: (540) 686-6747

**ENVIRONMENTAL:**

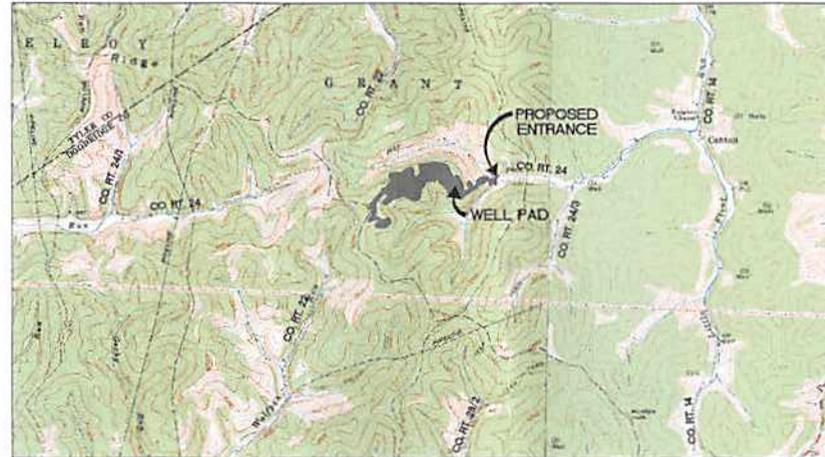
ALLSTAR ECOLOGY, LLC  
 RYAN L. WARD - ENVIRONMENTAL SCIENTIST  
 OFFICE: (866) 213-2666 CELL: (304) 692-7477

**RESTRICTIONS NOTES:**

1. THERE ARE NO WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE IS A PERENNIAL STREAM IMPACT THAT WILL NEED TO BE PERMITTED BY THE APPROPRIATE AGENCIES.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

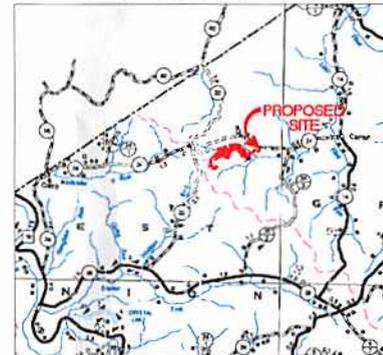
47-1706533  
**MELODY WELL PAD**  
**SITE DESIGN & CONSTRUCTION PLAN,**  
**EROSION & SEDIMENT CONTROL PLANS**

GRANT DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA  
 WOLFPEN RUN & LITTLE FLINT RUN WATERSHEDS  
 USGS 7.5 SMITHBURG AND WEST UNION QUAD MAPS



SCALE: 1" = 2000'

Electronic Version of These Plans May Be Viewed at: Q/OIL GAS/SAV FILES/REVIEWS  
 WEST VIRGINIA COUNTY MAP WYDOH COUNTY ROAD MAP



SCALE: 1" = 5000'

**DESIGN CERTIFICATION**

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERE TO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS CRS 35-8.

**SITE PLAN/CONSTRUCTION STAGING NOTE**

THE MELODY WELL PAD AS SHOWN IN THIS SITE PLAN IS ALSO SHOWN AS STAGING AREA "A" IN THE MELODY CENTRALIZED FRESHWATER IMPOUNDMENT SITE PLAN. REFER TO THE MELODY CENTRALIZED FRESHWATER IMPOUNDMENT SITE PLAN (STAGING AREA "B") FOR ALL CONSTRUCTION QUANTITIES ASSOCIATED WITH THE CONSTRUCTION OF THE MELODY WELL PAD SITE. THE PROPOSED LIMITS OF DISTURBANCE ACREAGE, AS SHOWN IN THIS PLAN IS REPETITIVE TO THE ACREAGE PREVIOUSLY SHOWN IN THE MELODY CENTRALIZED FRESHWATER IMPOUNDMENT SITE PLAN.

MISS Utility of West Virginia  
 1-800-245-4848  
 West Virginia State Law  
 (Section XIV: Chapter 24-C)  
 Requires that you call two  
 business days before you dig in  
 the state of West Virginia.  
**IT'S THE LAW!!**

APPROVED  
 WVDEP OOG  
 SAY 6/23/2014

**SHEET INDEX**

- 01 - COVER SHEET
- 02 - CONSTRUCTION AND E&S CONTROL NOTES
- 03 - EXISTING CONDITIONS
- 04 - OVERALL PLAN SHEET INDEX & VOLUMES
- 05 - ACCESS ROAD, STAGING AREA, & WELL PAD PLAN
- 06 - ACCESS ROAD PROFILES
- 07 - ACCESS ROAD SECTIONS
- 08 - WELL PAD SECTIONS
- 09 - STREAM CROSSING DETAILS
- 10-14 - CONSTRUCTION DETAILS
- 15 ACCESS ROAD, STAGING AREA, & WELL PAD RECLAMATION PLAN
- 16 FIRM EXHIBIT
- GE01-GE50 GEOTECHNICAL DETAILS

WEST VIRGINIA STATE PLANE COORDINATE SYSTEM  
 NORTH ZONE, NAD83  
 ELEVATION BASED ON NAVD83  
 ESTABLISHED BY SURVEY GRADE GPS & OPUS  
 POST-PROCESSING

MELODY LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Well Pad	3.09
<b>Total Affected Area</b>	<b>3.09</b>
Total Wooded Acres Disturbed	2.53
<b>Impacts to Melody Brown &amp; Deborah Lowe TM 5-11.1</b>	
Well Pad	1.62
<b>Total Affected Area</b>	<b>1.62</b>
Total Wooded Acres Disturbed	1.62
<b>Impacts to Melody Brown &amp; Deborah Lowe TM 4-10</b>	
Well Pad	1.47
<b>Total Affected Area</b>	<b>1.47</b>
Total Wooded Acres Disturbed	1.31

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Yoho	N 315185.66	N 315221.20	N 4356599.84	LAT 39-21-30.9650
Unit 2H	E 1643918.58	E 1612477.35	E 520748.14	LONG 80-45-33.0160
Weinhold	N 315176.95	N 315212.50	N 4356597.22	LAT 39-21-30.8796
Unit 1H	E 1643923.49	E 1612482.26	E 520749.69	LONG 80-45-32.9317
Weinhold	N 315188.24	N 315203.79	N 4356594.59	LAT 39-21-30.7942
Unit 2H	E 1643828.41	E 1612487.18	E 520751.22	LONG 80-45-32.8876
Deano	N 315159.53	N 315195.08	N 4356591.98	LAT 39-21-30.7688
Unit 1H	E 1643833.33	E 1612492.10	E 520753.76	LONG 80-45-32.8238
Bradford	N 315150.81	N 315186.37	N 4356589.33	LAT 39-21-30.8234
Unit 1H	E 1643838.24	E 1612497.01	E 520754.20	LONG 80-45-32.7194
Bradford	N 315142.12	N 315177.66	N 4356586.70	LAT 39-21-30.8380
Unit 2H	E 1643843.16	E 1612501.53	E 520755.65	LONG 80-45-32.6952
Krelier	N 315133.41	N 315168.95	N 4356584.08	LAT 39-21-30.4527
Unit 1H	E 1643848.07	E 1612508.84	E 520757.20	LONG 80-45-32.6311
Krelier	N 315124.70	N 315160.25	N 4356581.45	LAT 39-21-30.3673
Unit 2H	E 1643852.99	E 1612511.76	E 520758.93	LONG 80-45-32.5670
Rexal	N 315115.99	N 315151.54	N 4356578.82	LAT 39-21-30.2814
Unit 1H	E 1643857.90	E 1612516.67	E 520760.47	LONG 80-45-32.5028
Well Pad Elevation	1,135.0			

DATE	REVISION

Antero  
 THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

COVER SHEET  
**MELODY WELL PAD**  
 GRANT DISTRICT  
 DODDRIDGE COUNTY, WEST VIRGINIA



DATE: 03/04/2014  
 SCALE: AS SHOWN  
 SHEET 1 OF 16

**NAVITUS**  
 ENERGY ENGINEERING  
 Telephone: (888) 662-4185 | www.NavitusEng.com